

IN THE DRAWINGS

Corrected drawings are supplied herewith.

Enclosed is a Replacement Sheet showing the following amendment to Figure 1A.

The incorrect reference numbers 101 and 119 are replaced with the correct reference numbers 100 and 118.

REMARKS

This paper responds to the Office Action mailed on December 29, 2006.

Claims 1, 12-13, 16, 21, 24-29, and 32-37 are amended, claims 43-50 are canceled without prejudice or waiver of patentable content, and no claims are added; as a result, claims 1-42 are now pending in this application.

Applicant notifies the Examiner of the publication of a related application 2006/0289389A1 on December 28, 2006, and the publication of another member of the same patent family 2006/0263730A1 on November 23, 2006.

Affirmation of Election

Restriction to one of the following claims was required:

- I. Claims 1-41, drawn to a process of treating a dry-developed hard mask, classified in class 430, subclass 322.
- II. Claims 43-50, drawn to compositions for surface treatment of a dry-developed hard mask, classified in class 252, subclass 79.1

As provisionally elected by Applicant's representative, **David Suhl**, on November 26, 2006, Applicant elects to prosecute the invention of Group I, claims 1-42, without traverse.

The claims of the non-elected invention, claims 43-50, are hereby canceled. However, Applicant reserves the right to later file continuations or divisions having claims directed to the non-elected inventions.

Objections to the Drawings

The drawings were objected to as failing to comply with 37 CFR 1.84(p)(4) because the resist layer of Figure 1A has been misnumbered with reference character "119" instead of reference character "118" and the resist stack in Figure 1A has been misnumbered with reference character "101" instead of reference character "100". The Applicant appreciates the Examiner's thorough review of the drawings, and includes a replacement set of drawings in this response, correcting the inadvertent errors.

Objections to the Specification

The specification was objected to because of the use of the trademark Aleg® 820. The specification is amended herein to correct these, and other, inadvertent errors. No new matter has been added by these specification changes. Applicant thanks the Examiner for finding these errors.

§112 Rejection of the Claims

Claims 3-6, 10-11, 14-20, 22-23, 31-34 and 42 were rejected under 35 U.S.C. § 112, first paragraph, as lacking adequate description or enablement, in particular, the use of concentration ratios. Applicant respectfully traverses this rejection.

Applicant respectfully submits that the specification at page 9 line 30, page 10 line 4, and page 12 line 27 indicates that the “presence by volume” of an aqueous solution is the ratio indicated, as noted by the Examiner in the last sentence of paragraph 8 on page 4. To establish a *prima facie* case of lack of written description under § 112, each one of four elements must be demonstrated. Viz, (1) the application does not reasonably describe or convey the concepts (2) to one of ordinary skill in the art (3) at the time of filing the patent application (4) of the claimed invention. None of the elements has been shown in the outstanding Office Action. Therefore, since a *prima facie* case of lack of written description has not been made, and because the requisite information has indeed been disclosed in the Application as-filed, it is respectfully submitted that the specification is proper under 35 USC § 112, first paragraph. Thus, Applicant submits that the description is adequate for one of ordinary skill in the art to practice the invention without undue experimentation, and requests that this rejection under the first paragraph of 35 U.S.C. § 112 be withdrawn.

Claims 3-6, 10-38 and 42 were rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness. The first portion of this rejection, specifically the objection to the use of a concentration ratio, engenders the same response as given immediately above with reference to the 35 U.S.C. § 112, first paragraph rejection, and is respectfully traversed. The second portion of this rejection, specifically that made to the Markush group language, has been addressed by claim amendments contained herein. In view of the above, Applicant submits that the claims, as

amended, are proper and requests that this rejection under the second paragraph of 35 U.S.C. § 112 be withdrawn.

§103 Rejection of the Claims

Claims 1-4, 7-14, 16-21, 24-35, 37 and 39-41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Liu et al. (U.S. 7,064,078) in view of Szwejkowski et al. (U.S. 5,147,499). Applicant respectfully traverses this rejection.

The cited reference of Liu discloses the use of a process that uses a first photoresist mask to etch a first pattern on an amorphous carbon hard mask, remove the first photoresist, and then a second photoresist mask to etch a second pattern on the hard mask, remove the second photoresist, and then etches the combined pattern into the substrate. Applicant is unable to find any indication in the cited reference of Liu, or even a suggestion of a problem with residual photoresist material remaining after the removal of the photoresist.

The cited Szwejkowski reference discloses a method of removing a silicon and oxide containing sidewall material 26, which is inadvertently formed during the anisotropic etch, and over etch, which formed the polysilicon 20 into a polysilicon line 28. The sidewall material 26 is formed of silicon and oxides, and is not suggested to be a residual portion of the photoresist 32, as discussed at least at column 1, lines 32-42, and column 2, lines 4-11. The sidewall material 26 is stated to conventionally be removed by HF, and is stated to be formed of silicon and oxides (see col. 2, lines 29-38; col. 3, lines 5-11) and is stated to be “not purely polysilicon” (see col. 3, line 8). Applicant can find nothing in the cited reference suggesting that the silicon and oxide film 26 is residual photoresist, and the suggested methods, such a HF etching, are directed towards dielectric etch, and would have no clear affect on residual photoresist regions as in the present application.

Applicant respectfully submits that the suggested combination of references fails to describe or suggest at least the claimed features of “...removing the resist; and surface treating the substrate to remove residual resist under conditions that are selective to the hard mask and to the substrate ...”, as recited in independent claim 1, as amended herein, from which claims 2-4 depend. Since neither cited reference containing any suggestion of residual resist, or of removing the residue, the suggested combination does not contain the above noted feature.

Applicant respectfully submits that the suggested combination of references fails to describe or suggest at least the claimed features of “*...surface treating the substrate to remove residual resist ...*”, as recited in independent claim 7, from which claims 8-11 depend. As noted above, neither cited reference containing any suggestion of residual resist, or of removing the residue, and thus are inappropriate references.

Applicant submits that independent claims 16, 21, 24, 29, 35, 37 and 39 recite “*...surface treating the substrate to remove residual photoresist ...*”, which is not suggested by the combination of references. The remaining claims depend from these independent claims.

The dependent claims are believed to be patentable at least as depending from patentable base claims as shown above, since any claim depending from a nonobvious independent claim is also nonobvious. See M.P.E.P. § 2143.03. In view of the failure of the reference to describe or suggest at least removing residual photoresist, Applicant requests this rejection under 35 U.S.C. § 103(a) be reconsidered and withdrawn.

Claims 5-6, 11, 15-16, 25-29 and 31-34 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Liu et al. and Szwejkowski et al. as applied to claims 1-4, 7-14, 16-21, 24-35, 37 and 39-41 above, and further in view of Chen et al. (U.S. Publication 2005/0026435).

Applicant respectfully traverses this rejection.

The cited references of Liu and Szwejkowski lack the features discussed above with reference to the previous rejection. Chen is used in the outstanding Office Action to show that solutions of ammonium hydroxide and peroxide are known. Applicant respectfully submits that the addition of Chen does nothing to cure the above noted failure of the other references to suggest a surface treatment to remove residual photo resist material.

Specifically, Applicant respectfully submits that the suggested combination of references fails to describe or suggest at least the claimed features of “*...removing the resist; and surface treating the substrate to remove residual resist under conditions that are selective to the hard mask and to the substrate ...*”, as recited in independent claim 1, as amended herein, from which claim 5 depends. Since neither cited reference containing any suggestion of residual resist, or of removing the residue, the suggested combination does not contain the above noted feature.

Similar reasoning is believed to pertain to the remaining claims in question, which are thereby held to be in patentable condition. In view of the above discussion, Applicant requests this rejection under 35 U.S.C. § 103(a) be reconsidered and withdrawn.

Claims 21-23, 37-38 and 42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Liu et al. and Szwejkowski et al. as applied to claims 1-4, 7-14, 16-21, 24-35, 37 and 39-41 and further in view of Fang et al. (U.S. Publication 2005/0161338). Applicant respectfully traverses this rejection.

The cited reference of Liu and Szwejkowski lack the features discussed above with reference to the previous rejection. Fang is used in the outstanding Office Action to show that it is known to use solutions including sulfuric acid and citric acid. Applicant respectfully submits that the addition of Fang does nothing to cure the above noted failure to suggest a surface treatment to remove residual photo resist material.

Applicant respectfully submits that the suggested combination of references fails to describe or suggest at least the claimed features of “*...a photoresist layer disposed over the at least one antireflective coating; and surface treating the substrate to remove residual photoresist ...*”, as recited in independent claim 21, as amended herein. The cited references, whether taken alone or in any combination, do not suggest a surface treatment to remove residual photoresist, and thus can not provide the suggestion to one of ordinary skill in the art to obtain the claimed invention.

Similar reasoning is believed to pertain to the remaining claims in question, which are believed to be in patentable condition, as amended herein. In view of the above discussion, Applicant requests this rejection under 35 U.S.C. § 103(a) be reconsidered and withdrawn.

Provisional Double Patenting Rejection

Claims 12-23 and 35-38 were provisionally rejected under 35 U.S.C. 101 of double patenting over claims 1-12 and 24-27 of co-pending Application No. 11/494,056.

Applicant does not admit that the claims are obvious in view of co-pending Application No. 11/494,056. However, a Terminal Disclaimer in compliance with 37 C.F.R. 1.321(b)(iv) will be considered to obviate this rejection upon allowance of the recited claims in the co-pending application.

Claims 1-11, 24-34 and 39-42 were provisionally rejected under a non-statutory obviousness-type double patenting rejection, over claims 13-16, 19-20 and 23-34 of co-pending Application No. 11/494,056

Applicant does not admit that the claims are obvious in view of co-pending Application No. 11/494,056. However, a Terminal Disclaimer in compliance with 37 C.F.R. 1.321(b)(iv) will be considered to obviate this rejection upon allowance of the recited claims in the co-pending application.

Reservation of Rights

In the interest of clarity and brevity, Applicant may not have addressed every assertion made in the Office Action. Applicant's silence regarding any such assertion does not constitute any admission or acquiescence. Applicant reserves all rights not exercised in connection with this response, such as the right to challenge or rebut any tacit or explicit characterization of any reference or of any of the present claims, the right to challenge or rebut any asserted factual or legal basis of any of the rejections, the right to swear behind any cited reference such as provided under 37 C.F.R. § 1.131 or otherwise, or the right to assert co-ownership of any cited reference. Applicant does not admit that any of the cited references or any other references of record are relevant to the present claims, or that they constitute prior art. To the extent that any rejection or assertion is based upon the Examiner's personal knowledge, rather than any objective evidence of record as manifested by a cited prior art reference, Applicant timely objects to such reliance on Official Notice, and reserves all rights to request that the Examiner provide a reference or affidavit in support of such assertion, as required by MPEP § 2144.03. Applicant reserves all rights to pursue any cancelled claims in a subsequent patent application claiming the benefit of priority of the present patent application, and to request rejoinder of any withdrawn claim, as required by MPEP § 821.04.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney, David Suhl, at 508-865-8211, or the undersigned to facilitate prosecution of this application. If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

KEVIN SHEA ET AL.

By their Representatives,

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Date March 7, 2007

By / Mark V. Muller /
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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 7 day of March 2007.

Kate Gannon
Name

Kate G
Signature